

Test Plan for Aeration of DI Water

The following are the parameters that we want to monitor:

1. Dissolved Oxygen
2. pH
3. Conductivity

Steps for experiments:

1. Fill the reservoir with APS DI water.
2. Monitor all the above parameters by running the water through the circulating system without using the venturi (bypass valve completely open).
3. Start closing the bypass valve gradually so that water starts flowing through the venturi. By the position of the control valve we can estimate the water flow through the venturi (Currently we do not have a flow meter installed). If the air suction rate is very high then we might need to install a flow meter to control the flow precisely.
4. Six bypass valve positions are tabulated as following:

Bypass valve position	Water circulation without venturi	Water through the venturi
Completely open	46 gpm	0 gpm
Intermediate Position 1	40 gpm	6 gpm
Intermediate Position 2	30 gpm	16 gpm
Intermediate Position 3	20 gpm	26 gpm
Intermediate Position 4	10 gpm	36 gpm
Completely closed	0 gpm	46 gpm

5. Monitor the above parameters for each step until data stabilizes. Data recording interval depends on the suction rate and fluctuation rate.
6. At this stage we are planning to control temperature at 78 °F.
7. Since we are not very sure about the oxygen suction rate by the venturi and the absorption rate by the water I am not certain about the duration of the tests.

Analysis:

1. Determine the change in pH and conductivity as a function of dissolved oxygen level.
2. What is the capacity of the venturi with regard to:
 - a. How long does it take to saturate the water with oxygen at each flow rate
3. In atmospheric pressure the DO level in water is 8 ppm. If DO level goes up due to the use of the venturi, what is the stability of this DO level with time.
4. We are planning to increase the pH level to 7 to 7.5. Atmospheric CO₂ might reduce the pH level. We might have to use resin beds to compensate for CO₂.
5. At this point we might want to measure dissolved CO₂ also.